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Student Characteristics and Targeted Based Cognitive Tier II Interventions

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STUDENT CHARACTERISTICS AND TARGETED BASED COGNITIVE TIER II INTERVENTIONS

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ABSTRACT

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The purpose of this study was to examine the relationship between Tier II student characteristics and outcomes on a standardized reading assessment. Ninety students who scored in the lowest third on a Virginia standardized reading test were placed into one of three instructional groups: 1) a control group consistent with instruction from previous years, 2) a "teacher selected" treatment group in which teachers determined students' cognitive processing deficits and administered a chosen intervention, and 3) a "tested" treatment group in which students were administered the Woodcock Johnson III Tests of Cognitive Abilities (WJ-III) and assigned interventions based on the results. The mean scores in groups by students' (a) previous retention status, (b) instructional group, (c) age, and (d) gender were examined. Results indicated that previous retention status significantly predicted test scores and that student age, gender, and instructional group were not significantly related to test scores. Furthermore, interaction effects between retention and instructional group were not found.

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Chapter I: Literature Review

Many obstacles to early student literacy are present in today's school systems. These include schools and families positioned in impoverished communities, inequitable access to academic resources, poor teacher quality, lack of continuity between home and school life, and other factors. The aversive effects of these obstacles are particularly potent among early elementary students who have difficulties with reading and are in need of targeted instruction. When efforts are not made to intervene, the students are likely to develop lifelong problems that develop from this early inadequacy. Some extreme examples include future dropout status, lack of employment, and incarceration (Graves, 2010). The severity of these circumstances necessitates the need to provide at-risk students with the most effective and appropriate type of instruction tailored to their particular needs.

Response to Intervention (RTI), a three-tiered instructional delivery model, has been shown to be effective at addressing the diverse learning needs of students (Rinaldi, Averill, & Stuart, 2011; Moore & Whitfield, 2009). Within this framework, students are provided high-quality, evidence-based instruction at Tier I, Tier II, and Tier III. As students fail to respond to general instruction at Tier I as evidenced through progress monitoring, they are provided with additional targeted instruction at the level of Tier II and Tier III (National Center on Response to Intervention, 2010). Whereas students who struggle the most are offered intense targeted instruction and possibly determined to be eligible for special education services at Tier III, the students at the Tier II level are considered "at-risk" and adjustments are made in the intensity and/or nature of instruction. It is at this stage that early detection of reading problems can be made, and proper actions taken to address them, leading to the possible prevention of future

academic problems and the attainment of skills necessary to perform well at the Tier I level. Not only is it essential for educators to be aware of empirically validated instruction methods and methods of monitoring progress that are used within Tier II, it is also important to consider the individual needs of students receiving instruction at this level. Knowledge of the students' strengths, weaknesses, and individual characteristics could potentially assist in selecting the most appropriate type of targeted instruction (Gersten et al., 2008).

Many studies have shown evidence of the relationship of student characteristics such as previous retention status, targeted instructional intervention received, gender, and age to academic achievement (Aikens & Barbarin, 2008; Jimerson, 2001; Robinson & Lubienski, 2011; Lawlor, Clark, Ronalds, & Leon, 2006). Some of these variables have been shown to be strong predictors of academic outcomes. Additionally, researchers have examined the relationship between low-performing student characteristics and targeted instructional interventions. These studies have revealed that students who, for example, are English language learners, have lower IQ scores, and are of lower socioeconomic status, benefit most from targeted interventions (O'Connor, Harty, & Fulmer, 2005).

However, a review of the literature yielded little examination of the relationship between, specifically, *Tier II* student characteristics and the types of targeted instructional intervention these students receive, especially those based in *cognitive processing strategies*. Are characteristics such as previous retentions, gender, and age more likely to be associated with academic outcomes than empirically validated interventions? If so, should focusing on interventions addressing the issues associated with those characteristics be more important? If not, is it possible that targeted interventions work especially well for Tier II students with certain characteristics? What interventions are most beneficial for these students? This lack of specific

information signifies the need for more evidence of this relationship between student needs and appropriate instruction.

Gender

Disparities in academic performance between male and female students have been observed in U.S. schools as well as those of other industrialized nations, contributing to the "gender gap" in academic outcomes (Gates, 1961; Rampey, Dion, & Donahue, 2009; Ma, 2008; Robinson & Lubienski, 2011). Much of the research reveals a distinct advantage for girls over boys in reading and writing although the gap varies throughout the course of development and across distributions (Ma, 2008; Robinson & Lubienski, 2011). Several theoretical bases have been used in accounting for the difference in performance between genders, including biological (e.g., Benbow & Stanley, 1983) and sociological (e.g., Walkerdine, 1988) perspectives. Despite varying theoretical perspectives and the solutions derived from them, the gender gap in reading favoring females continues to exist in contemporary schools.

Early research concerning this gender gap revealed, for example, that females in age groups between second and eighth grades scored higher than males in reading (Gates, 1961). This gap has persisted into the 21st century although it has narrowed somewhat. For example, according to NAEP results from 1971 and 2008, this gap narrowed to thirteen points and seven points, respectively (Rampey et al., 2009). Examining more current data concerning boys' lower scores reveals no consistent trend in narrowing despite broad efforts at improving national education through policies such as the No Child Left Behind (NCLB) Act of 2001. Data from the 2009 NAEP scores show that males achieve reading levels in all categories (i.e., basic, proficient, advanced) at lower rates than females in all 50 states. Additionally, the overall percentage of boys scoring at proficient or higher reading levels are below that of females

according to standardized test results reported by the Center for Educational Policy. The data clearly show a distinct advantage for females, but when does this gap manifest and which groups of students are the most affected?

Children begin to develop the skills and knowledge they need to read and write before entering school, but will gain many of the most crucial skills (i.e., phonemic awareness) in early elementary school. Students who struggle with these concepts early on tend to continue struggling as they move through the elementary grades. Male children who have trouble with reading skills upon entering school tend to fall behind their peers between kindergarten and third grade (Husain & Millimet, 2009). Although lower performing students already face various academic disadvantages, the gender gap is even more pronounced in these groups than in higher-performing groups. The reading gender gap narrows in the top percentiles of students but widens in the lowest parts of the distribution over time, putting low-performing boys at even more risk (Robinson & Lubienski, 2011).

Other variables also contribute to the disadvantage male children have in reading, including school climates and teacher behaviors. Teacher ratings reveal much about the attitude they maintain toward groups of students and the expectations placed on them. Traditionally, teachers have tended to overestimate boys' ability in mathematics and science while underestimating their ability in reading and writing (Robinson & Lubienski, 2011). In examining the correlation between teacher ratings and actual test scores, Robinson and Lubienski (2011) found a negative relationship between teachers' ratings and boys' scores on direct cognitive assessments, suggesting an ill-founded bias against male students. Furthermore, this negative gap widened over time. Teachers are also twice as likely to refer boys for special education services

than girls (Flynn & Rahbar, 1994) even after accounting for actual reading scores (Hibel, Farkas, & Morgan, 2006).

Age

Research addressing the differences in academic outcomes for students younger in relation to their peers in the elementary school years points to consistent trends but has not provided a definite reason as to why these differences occur (Crosser, 1986; Russell & Startup, 1986; Wilson, 2000). Most research defines age in this context as the child's month of birth. In U.S. schools, children enter school in late August or early September, placing students born in the summer months (June, July, August) in the youngest group among their peers.

Two orientations concerning the effect of month of birth on achievement exist amongst the majority of researchers. The first is a biological orientation associated with differences in intrauterine development between seasons of the year (McPhillips & Jordan-Black, 2009). Many studies have produced evidence linking birth weight and childhood intelligence (i.e., Jefferis, Power, & Hertzman, 2002). Variables such as external temperatures and maternal access to nutrition throughout different months could potentially affect prenatal development and, by extension, future academic achievement.

The second orientation arises from a sociological perspective in that children of varying ages by month are placed into a single school entry group. School policy dictates entry points, therefore creating the potential for an age-position effect. For example, Goodman, Gledhill, and Ford (2003) found the greatest concentration of psychopathological symptoms among English children born in the summer months and Scottish children born during January or February. Because both English and Scottish educational policy permit different school entry points

(September and March, respectively), differences between these children could not be connected to season of birth, but age of school entry.

Although both of these orientations have not been shown to correlate to academic achievement on a consistent basis, most evidence points to a weak season-of-birth effect on reading achievement and other aspects of intelligence, suggesting an age-position, or school entry, effect (Lawlor et al., 2006). A review of much of the literature on age-position effects on academics reveals an advantage for older children over their youngest peers (Crosser, 1986). Specifically, U.S. children born in autumn semester months (September, October, November, December) outperform those born in spring semester months (January, February, March, April) who outperform those born in summer months (May, June, July, August) that make up the youngest at school entry (Russell & Startup, 1986). In addition to lower scores and grades, summer-born students are more likely to have moderate learning difficulties and are overrepresented in groups of children who receive special education services (Wilson, 2000). The age-position disadvantage for the youngest students has not been shown to persist into later school years, however, as these differences mostly disappear by eight years of age (McPhillips & Jordan-Black, 2009). This evidence further emphasizes the need for intervention during the early elementary school years where this short-term disadvantage could set children up for larger deficits in the future.

Contrary to the biological perspective of season-of-birth proponents, this age-position disadvantage has more to do with teachers and school systems than with the children themselves. These children may not be developmentally ready to enter kindergarten at the same time as their older peers who are prepared for the social, emotional, and cognitive demands of elementary school (Sharp, Hutchinson, & Whetton, 1994; West & Varlaam, 1990). As is the case for gender,

teacher expectancy plays a role in the outcomes for these younger students. Teachers are more likely to label younger children as immature and actually underestimate the performance of summer-born children while overestimating the performance of autumn-born children (Mortimore, Sammons, Stoll, Leux, & Ecob, 1988).

Targeted Instructional Intervention

High quality instruction in the classroom is one of the largest contributors to educational outcomes for students and likely has high predictive value for future student achievement. For example, most students receiving high quality delivery of evidence-based instruction models based on core reading programs will make positive progress in reading and continue to do so in later school years (Gersten et al., 2008). Students with reading difficulties, however, often require additional instruction in order to make the necessary gains to engage in more advanced literacy skills. These additional interventions are often part of a systematic approach to providing evidence-based instruction to meet the needs of these students. One such widely used system is Response-to-Intervention (RTI). RTI is a multi-tiered (e.g., Tier I, II, and III) approach to instruction that provides appropriate interventions to students as preventative measures (Brown-Chidsey & Steege, 2005; National Association of State Directors of Special Education, 2005). Within this framework, about 25-35% of students need additional instruction and more frequent assessment under Tier II and Tier III intervention (Murray, Woodruff, & Vaughn, 2010).

The nature of students' responses to Tier I, II, and III intervention has been shown to have some predictive value about reading achievement in subsequent years. These predictions are particularly useful in the early school years and for struggling students as only about 13% of struggling students benefit from reading intervention after fourth grade (Wren, 2003). Students' scores in oral reading fluency in Tier I instruction at the end of first grade have been shown to

predict oral reading fluency and comprehension at the end of second grade (Schatschneider, Wagner, & Crawford, 2008). Other studies have also found predictive value in students' response to intervention. For example, kindergarten students who responded well to Tier II intervention in one study achieved first grade level reading performance a year later (Coyne, Kame'enui, Simmons, & Harn, 2004). Another study examining reading disabled elementary school students' response to tiered intervention showed that the interventions had a significant positive effect on reading accuracy and comprehension and that these positive gains were maintained two years later (Torgesen et al., 2001). It should be noted, however, that other relevant research has failed to predict future reading achievement based on students' response to literacy intervention (Otaiba et al., 2011). Although predictive value has been found for some students, many variables within intervention (e.g., teacher skill, intervention fidelity, intervention quality) may affect educational outcomes and reduce its association with later achievement.

Evidence for the use of interventions that target and address problems with cognitive processing have been shown to be particularly effective in guiding decisions about the most effective interventions to use at the Tier II level (Semrud-Clikeman, 2005). This cognitive processing strategy approach includes consideration of domains such as working memory, attention, executive function, and comprehension—each with corresponding evidence-based interventions—as measured by the Woodcock Johnson III Tests of Cognitive Abilities (WJ-III; Woodcock, McGrew, & Mather, 2001). Specifically, working memory has been shown to be important to the development of literacy skills as mentally holding information while processing other information is crucial to reading (Semrud-Clikeman, 2005). Because deficits in these cognitive processing domains can be measured using assessment, interventions can be tailored specifically to address students' individual problems.

Retention

Retention of students, also known as “being held back” or “flunking,” as a practice in schools has received much attention from researchers in education and psychology. The prevailing logic behind the practice of retention is based on the idea that students who fall behind in one grade will not be able to perform the kind of work that students typically come into contact with in the next grade and should receive additional instruction and rehearsal by repeating the failed grade. Despite teacher and administrator accounts of individual successes with retention, the overwhelming evidence of this practice reveals it as ineffective and possibly damaging to students. In a recent meta-analysis of the considerable body of important research on retention, Jimerson (2001) found that only nine of 82 studies produced results that showed an academic benefit for students who were retained. Additionally, it has been found that any short-term gains in achievement experienced by retained students diminish over time and completely disappear in later grades where those gains are replaced by deficits and poor performance (Holmes, 1989).

Student retention also has predictive value for academic, emotional, social, and behavioral outcomes for future grades and adult life. Retention has been found to be one of the most powerful predictors of future dropout status for students (Jimerson, 1999; Rumberger, 1995). In a 21-year longitudinal study, retained students were more likely to dropout before age 19 and less likely to receive a high school diploma by age 20, less likely to attend college, and are paid less per hour than comparable high school and college graduates (Jimerson, 1999). Often students are retained for poor behavior and social skills even when their reading skills are average compared to less troubled peers (Murray et al., 2010). Although it can be expected that some short-term gains in academics will occur after a student has been retained, it is clear that

these gains are short-lived and distract teachers and administrators from the extreme likelihood that retained students often continue to fall behind, sometimes resulting in dropout.

The intentions of this study are to address two questions in particular. First, how are characteristics of Tier II students including previous retention status, instructional interventions received, gender, and age in relation to peers related to scores on a standardized reading test? Do any of these characteristics significantly predict outcomes? It is hypothesized that previous retention status and intervention type will be the only variables among the previously mentioned to have significant predictive value. Second, how does the type of intervention received interact with the student characteristics that are significantly related to the test scores? In answering these questions, more evidence will be provided of what helps Tier II students learn to read more effectively.

Chapter II: Method

Participants

As part of a larger study examining the effectiveness of interventions based in cognitive processing strategies, participants were selected from fifteen third grade classes in a rural area of western VA. Totaling at 90 students, 66% of participants were male and 33% were female, the mean age was 9 years 4 months, and ages ranged from 8 years 6 months to 10 years 10 months. The primary selection criterion was based on the participants' performance on a pretest reading benchmark in which students scoring in the bottom third and not receiving special education services (Tier III) were included in the current study.

Measures

Participants were categorized using four characteristic variables: (a) previous retentions, (b) intervention type as determined by participant placement in the control group or one of two treatment groups explained below, (c) gender, and (d) age in months. Educational outcomes were derived from participant reading scores on the state of Virginia's curriculum-based standardized assessment (SOL).

Procedure

Students in the Control Group received instruction consistent with previous years and function as a control group. Students in treatment 2, or the Teacher Selected Group, received instruction from teachers who were specifically trained to choose interventions. This training included instruction in intervention strategies based on cognitive processing strategies. Teachers in this treatment group chose strategies for students based on their own best judgment. Students in treatment 3, or Tested Group, were administered the Woodcock Johnson III Test of Cognitive Abilities to determine deficit areas in each student's cognitive processing ability. Students were

then assigned interventions (in which teachers were trained) matched to their deficit areas. Subsequent testing (SOL scores) determined differences between each group. Several analyses examined the relationships between student characteristics and SOL scores.

Chapter III: Results

A series of Pearson correlation coefficients were calculated to determine the relationship between the examined student variables and SOL reading scores. The descriptive statistics are depicted in Tables 5-8 in Appendix and the results of this analysis in Table 1. A moderate negative correlation was found for retention (r (88) = -.322, p = .002), indicating a significant linear relationship between the variables. Previously retained students tended to perform more poorly than those who had not been retained. A weak correlation that was not significant was found (r (88) = .105, p > .05) between gender and SOL scores, (r (88) = -.129, p > .05) age and SOL scores, and (r (88) = -.081, p > .05) instruction group and SOL scores. Gender, age, and instruction group were not related to test scores.

Table 1
Correlations with SOL Reading Scores

		SOL Scores	Gender	Age	Retention	Assigned Group
SOL Scores	Pearson Corr.	1	.105	-.129	-.322**	-.081
	Sig. (2-tailed)		.323	.225	.002	.449
	N	90	90	90	90	90
Gender	Pearson Corr.	.105	1	.111	-.144	-.057
	Sig. (2-tailed)	.323		.297	.175	.592
	N	90	90	90	90	90
Age	Pearson Corr.	-.129	.111	1	.450**	.065
	Sig. (2-tailed)	.225	.297		.000	.542
	N	90	90	90	90	90
Retention	Pearson Corr.	-.322**	-.144	.450**	1	.239*
	Sig. (2-tailed)	.002	.175	.000		.023
	N	90	90	90	90	90
Instruction Group	Pearson Corr.	-.081	-.057	.065	.239*	1
	Sig. (2-tailed)	.449	.592	.542	.023	
	N	90	90	90	90	90

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

A simple linear regression was calculated predicting students' SOL scores based on previous retention status. The inclusion of retention as a sole predictor was based upon its significant linear relationship with test scores and the nonsignificant relationship between the other variables and test scores. The results of this analysis are depicted in Tables 2. Previous retention status significantly predicted test scores ($F(1, 88) = 10.179$, $p = .002$), with an R^2 of .104. Students predicted posttest score is equal to 25.671 – 6.671 (RETENTION). Again, students were more likely to perform poorly if they had previously been retained.

Table 2.a

Model Summary of Retention as Predictor

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.322[a]	.104	.093	5.645

a. Predictors: (Constant), Retention

Table 2.b

ANOVA Summary of Retention as Predictor

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	324.346	1	324.346	10.179	.002[b]
	Residual	2804.110	88	31.865		
	Total	3128.456	89			

a. Dependent Variable: Post-Test Scores

b. Predictors: (Constant), Retention

Table 2.c

Coefficients with Retention as Predictor

Model					t	Sig.	95.0% CI for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	25.671	.623		41.180	.000	24.432	26.910
	Retention	-6.671	2.091	-.322	-3.190	.002	-10.826	-2.516

a. Dependent Variable: Post-Test Scores

In order to address the second hypothesis, a 3 (instruction group) x 2 (previous retention status) between-subjects factorial ANOVA was calculated comparing the SOL reading scores for students who were in one of the three instructional groups and who had or had not been previously retained to examine any interaction effects between the groups. The descriptive statistics and results of this analysis are depicted in Table 3 and Table 4, respectively. A significant main effect for retention status was found ($F(1, 85) = 10.484$, $p = .002$). Students who had been retained had lower scores ($m = 18.20$, $sd = 2.05$) than those who had not ($m = 25.652$, $sd = .623$). The main effect for instruction group was not significant ($F(2, 85) = 1.828$, $p > .05$).

Finally, the interaction between instruction group and previous retention status was not significant ($F(1, 85) = 1.392$, $p > .05$). Thus, it again appears that previous retention status has a significant effect on the SOL reading scores, while the assigned instruction group appears to have no interactive effect with students' retention status.

Table 3
SOL Scores: Instruction Groups by Previous Retention Status

Assigned Group	Retention	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Control Group	No	30	25	8	33	26.33	5.874	34.506
	Total	30	25	8	33	26.33	5.874	34.506
Teacher Group	No	27	22	9	31	24.70	5.836	34.063
	Yes	3	3	14	17	15.00	1.732	3.000
	Total	30	22	9	31	23.73	6.286	39.513
Tested Group	No	25	26	7	33	25.92	5.322	28.327
	Yes	5	15	13	28	21.40	5.367	28.800
	Total	30	26	7	33	25.17	5.509	30.351
Total	No	82	26	7	33	25.67	5.672	32.174
	Yes	8	15	13	28	19.00	5.318	28.286
	Total	90	26	7	33	25.08	5.929	35.151

Table 4

ANOVA Summary: Instruction Group and Previous Retention Interaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	441.119[a]	4	110.280	3.488	.011	.141
Intercept	15750.008	1	15750.008	498.170	.000	.854
Retention	331.461	1	331.461	10.484	.002	.110
Group	115.603	2	57.802	1.828	.167	.041
Retention * Group	44.024	1	44.024	1.392	.241	.016
Error	2687.336	85	31.616			
Total	59729.000	90				
Corrected Total	3128.456	89				

a. R Squared = .141 (Adjusted R Squared = .101)

Chapter IV: Discussion

The findings of this study suggest that, among student gender, age, previous retention status, and assigned instructional group based on CHC theory, previous retentions were found to be the only statistically significant predictor of SOL reading scores. Specifically, students who were previously retained were more likely to have lower scores than students who were not retained. The relationship that retention has with test scores in this sample of students is not surprising considering the preponderance of research that clearly shows retention to be an ineffective, and often harmful, practice. Such research gives evidence that retention is one of the most powerful predictors of future dropout status (Jimerson, 1999; Rumberger, 1995) and very unlikely to produce long-term academic benefits (Jimerson, 2001). The significant relationship found between retention and test scores in this study are highlighted when considering the small number of subjects who were retained. The retention status of eight out of ninety students accounting for approximately 10% of the variance in test scores further reflects the findings of research on retention. The small sample size and absence of retained students in the control group, however, may limit the generalizability of these findings.

It was hypothesized that the other variables, including student gender and age, would not be significantly related to SOL scores. The current findings support this hypothesis. The research supporting the predictive value of these variables is somewhat mixed, and this study contributes by failing to find significant linear relationships between the variables and test scores. Traditionally, the gap in performance between males and females has been in favor of females; however, this trend has decreased over the last four decades (Rampey et al., 2009). Some evidence has been found for a month of birth, or age-position, effect on student performance. Younger students tend to show lower performance than their older peers (Russell & Startup,

1986). The findings of this study do not support this body of research. The age-position effect has been found to largely disappear by eight years (McPhillips & Jordan-Black, 2009), however, and the findings of this study appear to be consistent with this. All of the students in this sample are older than eight years as seen in Table 9 below. It is possible that any age-position differences in test performance are unlikely to be found in students of this age and that previous retention status could account for this decrease in scores.

Table 9
Student Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	90	103	130	112.56	5.459

It was also hypothesized that the instruction groups would have significant predictive relationships with SOL scores and possible interaction effects with other predictor characteristics—even if they were less powerful than previous retention status. The current findings fail to support this hypothesis. Specifically, there were no differences in mean SOL scores between the "instruction-as-usual" control group, the "teacher selected" treatment group, and the "tested" treatment group. Other confounding variables may account for the differences in these groups above the treatment intervention group. These include the social and behavioral dynamics of each classroom, the competence and motivation of the teachers, the organizational structure and culture of the selected schools, etc.

Some limitations must be taken into consideration when interpreting the results of this analysis. First, the sample of students selected from a rural school system in Virginia may not reflect the characteristics and performance of students from other areas of the United States. This limits the generalizability of the findings. Second, the control group lacked previously retained

students. Although the analysis of the two treatment groups revealed a significant relationship between retention status and SOL scores, comparison of the treatment groups with a control group containing retained students would provide a more thorough analysis.

A suggestion for future research into the association between previous retention status and academic achievement would be to differentiate between the years in which students are retained. Despite some evidence of a lack of difference between students retained in K through 2nd and those retained in 3rd through 6th grades, many teachers and administrators believe retention in early grades to produce more academic gains and less adverse social and emotional effects than retention in later grades (Silberglitt, Jimerson, Burns, & Appleton, 2006). More evidence of the presence or lack of differences between outcomes for early retention and later retention is needed.

Studies such as these would provide more useful information by including analysis of socioeconomic status. A large body of research provides evidence that a child's SES is related to the quality and quantity of the kind of educational experiences that are essential to future academic success (Hart & Risley, 1995; Lee & Burkam, 2002; Roscigno & Ainsworth-Darnell, 1999). In fact, many studies have found familial SES to be the greatest contributing factor to children's school readiness and early reading performance (Foster & Miller, 2007). Because the availability of such information for individual students is limited due to federal regulations under the Child Nutrition and WIC Reauthorization Act (2004), we were unable to include SES in this analysis.

The findings of this study reiterate the overwhelming claims of a large body of research that denounces retention as an effective educational practice. The powerful effect of retention on the students' SOL performance brings to the forefront the need to employ alternative strategies

rather than retention of struggling students who need targeted academic interventions. The National Association of School Psychologists (Jimerson, 2001) recommends several alternatives. These include (a) getting students' parents involved in their children's learning, (b) ensuring that instructional interventions are age- and culturally appropriate, (c) developing teachers' skills in working with multi-age and multi-level ability groups to ensure students are receiving instruction specifically aimed at their level of understanding, (d) establishing early reading programs, (e) providing effective school-based mental health services, (f) identifying specific learning or behavioral disabilities, designing interventions specific to these issues, and evaluating the effectiveness, (g) providing appropriate special education services when needed, (h) enrolling students in tutoring programs, and (i) implementing a systems-level approach to address the many barriers to learning, such as lack of access to health care, transportation, etc. These alternative approaches should be used in addition to evidence-based instructional strategies and frequent progress monitoring to ensure that Tier II students are being served to the fullest extent possible.

References

Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology, 100(2),* 235-251.

Benbow, C., & Stanley, J. (1983). Gender differences in mathematical reasoning ability: More facts. *Science, 222(4627),* 1029-31.

Brown-Chidsey, R. & Steege, M. W. (2005). *Response to intervention: Principles and strategies for effective practice*. New York: Guilford Press.

Coyne, M., Kame'enui, E., Simmons, D., & Harn, B. (2004). Beginning reading intervention as inoculation or insulin: First grade reading performance of strong responders to kindergarten intervention. *Journal of Learning Disabilities, 37,* 90-106.

Crosser, S. (1986). Summer birth date children: Kindergarten entrance age and academic achievement. *Journal of Educational Research, 79(6),* 140-6.

Foster, W. A., & Miller, M. (2007). Development of the literacy achievement gap: A longitudinal study of kindergarten through third grade. *Language, Speech, and Hearing Services in Schools, 38,* 173-181.

Flynn, J. M., & Rahbar, M. H. (1994). Prevalence of reading failure in boys compared with girls. *Psychology in the Schools, 31,* 66-71.

Gates, A. I. (1961). Sex differences in reading ability. *Elementary School Journal, 61(8),* 431-434.

Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linan-Thompson, S., & Tilly, W. D. (2008). *Assisting students struggling with reading: Response to intervention and multi-tier intervention in the primary grades* (NCEE Publication No. 2009-4045).

Goodman, R., Gledhill, J., & Ford, T. (2003). Child psychiatric disorder and relative age within school year: Cross sectional survey of large population sample. *British Medical Journal, 327,* 472-475

Graves, A. W. (2010). The longitudinal study of the impact of effective beginning reading instruction for English learners: Literacy, language, and learning disabilities. In T. Scruggs & M. Mastropieri (Eds.), *Advances in learning and behavioral disabilities* (vol. 23, pp. 155–174). London: Emerald.

Hart, B., & Risley, T. (1995). *Meaningful differences in the everyday experiences of young American children*. Baltimore: Brookes Publishing.

Hibel, J., Farkas, G., & Morgan, P. (2006). *Who is placed in special education?* (Population Research Institute Working Paper 06-05). University Park: Pennsylvania State University.

Holmes, C. T. (1989). Grade-level retention effects: A meta-analysis of research studies. In L. A. Shepard & M. L. Smith (Eds.), *Flunking grades: Research and policies on retention* (pp. 16-33). London: The Falmer Press.

Husain, M., & Millimet, D. (2009). The mythical "boy crisis"? *Economics of Education Review, 28,* 38-48.

Jefferis, B. J., Power, C., & Hertzman, C. (2002). Birth weight, childhood socioeconomic environment, and cognitive development in the 1958 British birth cohort study. *British Medical Journal, 325,* 305.

Jimerson, S. R. (1999). On the failure of failure: Examining the association of early grade retention and adolescent education and employment outcomes. *Journal of School Psychology, 37,* 243-272.

Jimerson, S. R. (2001). Meta-analysis of grade retention research: Implications for practices in the 21st century. *School Psychology Review, 30(3),* 420-437.

Lawlor, D. A., Clark, H., Ronalds, G., & Leon, D. A. (2006). Season of birth and childhood intelligence: Findings from the Aberdeen Children of the 1950s cohort study. *British Journal of Educational Psychology*, *76,* 481-499.

Lee, V. E., & Burkam, D. T. (2002). *Inequality at the starting gate: Social background differences in achievement as children enter school.* Washington, DC: Economic Policy Institute.

Ma, X. (2008). Within-school gender gaps in reading, mathematics, and science literacy. *Comparative Education Review, 52(3),* 437-460.

McPhillips, M. & Jordan-Black, J. (2009). The effect of month of birth on the attainments of primary and secondary school pupils. *British Journal of Educational Psychology, 79,* 419-438.

Moore, J., & Whitfield, V. (2009). Building schoolwide capacity for preventing reading failure. Reading Teacher, 62(7), 622-624.

Mortimore, P., Sammons, P., Stoll, L., Leux, D., & Ecob, R. (1988). *School matters: The junior years*. Shepton Mallet: Open Books.

Murray, C. S., Woodruff, A. L., & Vaughn, S. (2010). First-grade student retention within a 3-tier reading framework. *Reading & Writing Quarterly*, *26,* 26-50.

National Association of State Directors of Special Education. (2005). *Response to intervention: Policy considerations and implementation.* Alexandria, VA: NASDSE.

National Center on Response to Intervention. (2010, April). *Essential components of RTI: A closer look at response to intervention*. Retrieved from http://www.rti4success.org/pdf/rtiessentialcomponents_042710.pdf

O'Connor, R. E., Harty, K. R., & Fulmer, D. (2005). Tiers of Intervention in Kindergarten Through Third Grade. *Journal Of Learning Disabilities*, *38*(6), 532-538.

Otaiba, S. A., Folsom, J. S., Schatschneider, C., Wanzek, J., Greulich, L., Meadows, J., Li, Z., & Connor, C. M. (2011). Predicting first-grade reading performance from kindergarten response to Tier I instruction. *Exceptional Children, 77(4),* 453-470.

Rampey, B. D., Dion, G. S., & Donahue, P. L. (2009). *NAEP 2008 trends in academic progress* (NCES 2009-479). Washington, DC: National Center for Education Statistics.

Rinaldi, C., Averill, O., & Stuart, S. (2011). Response to intervention: Educators' perceptions of a three-year RTI collaborative reform effort in an urban elementary school. *Journal of Education, 191(2),* 43-53.

Robinson, J. P. & Lubienski, S. T. (2011). The development of gender achievement gaps in mathematics and reading during elementary and middle school: Examining direct cognitive assessments and teacher ratings. *American Educational Research Journal, 48(2),* 268-302.

Roscigno, V. J., & Ainsworth-Darnell, J. W. (1999). Race, cultural capital, and educational resources: Persistent inequalities and achievement returns. *Sociology of Education, 72,* 158-178.

Rumberger, R. (1995). Dropping out of middle school: A multilevel analysis of students and schools. *American Educational Research Journal, 32,* 583-625.

Russell, R. & Startup, M. (1986). Month of birth and academic achievement. *Journal of Personal Individual Experience, 7(6),* 839-46.

S. 2507--108th Congress: Child Nutrition and WIC Reauthorization Act of 2004. (2004). In www.GovTrack.us. Retrieved April 2, 2013, from http://www.govtrack.us/congress/bills/108/s2507

Schatschneider, C., Wagner, R. K., & Crawford, E. C. (2008). The importance of measuring growth in response to intervention models: Testing a core assumption. *Learning and Individual Differences, 18,* 308-315.

Semrud-Clikeman, M. (2005). Neuropsychological aspects for evaluating learning disabilities. *Journal of Learning Disabilities, 38(7),* 563-568.

Sharp, C., Hutchinson, D., & Whetton, C. (1994). How do season of birth and length of schooling affect children's attainment at key stage 1? *Educational Research, 32(2),* 107-121.

Silberglitt, B., Jimerson, S. R., Burns, M. K., & Appleton, J. J. (2006). Does the Timing of Grade Retention Make a Difference? Examining the Effects of Early Versus Later Retention. *School Psychology Review*, 35(1), 134-141.

Torgesen, J.K., Alexander, A. W., Wagner, R. K., Rashotte, C.A., Voeller, K., Conway, T., et al. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34,* 33-58.

Walkerdine, V. (1988). *Mastery of reason: Cognitive development and the production of rationality*. London: Routledge.

West, A. & Varlaam, A. (1990). Does it matter when children start school?, *Educational Research, 32(3),* 210-17.

Wilson, G. (2000). The effects of season of birth, sex, and cognitive abilities on the assessment of special educational needs. *Educational Psychology, 20(2),* 153-166.

Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). Woodcock-Johnson III Tests of Cognitive Abilities. Itasca, IL: Riverside.

Wren, S. (2003). *Developing research-based resources for the balanced reading teacher: Matthew effects in reading.* Available at http://www.BalancedReading.com

Appendix

Table 5

SOL Scores by Instruction Group

Assigned Group	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Control Group	30	25	8	33	26.33	5.874	34.506
Teacher Group	30	22	9	31	23.73	6.286	39.513
Tested Group	30	26	7	33	25.17	5.509	30.351
Total	90	26	7	33	25.08	5.929	35.151

Table 6

SOL Scores by Gender

Gender	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Male	59	26	7	33	24.63	6.446	41.548
Female	31	19	14	33	25.94	4.774	22.796
Total	90	26	7	33	25.08	5.929	35.151

Table 7

SOL Scores by Previous Retention Status

Retention	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
No	82	26	7	33	25.67	5.672	32.174
Yes	8	15	13	28	19.00	5.318	28.286
Total	90	26	7	33	25.08	5.929	35.151

Table 8
SOL Scores by Age

Age	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
103	1	0	24	24	24.00	.	.
105	4	7	25	32	29.00	3.559	12.667
106	5	9	21	30	25.80	4.087	16.700
107	6	19	14	33	24.67	6.501	42.267
108	10	25	8	33	22.30	7.134	50.900
109	4	4	25	29	27.00	1.826	3.333
110	8	10	21	31	26.75	3.576	12.786
111	5	24	7	31	22.00	9.670	93.500
112	5	15	17	32	25.60	6.269	39.300
113	7	22	9	31	25.14	7.819	61.143
114	4	5	24	29	26.00	2.160	4.667
115	5	7	25	32	27.20	2.950	8.700
116	9	11	22	33	29.33	3.606	13.000
117	3	6	25	31	28.33	3.055	9.333
118	2	9	13	22	17.50	6.364	40.500
119	2	13	14	27	20.50	9.192	84.500
120	4	17	12	29	21.50	7.047	49.667
122	1	0	28	28	28.00	.	.
125	3	9	14	23	18.67	4.509	20.333
126	1	0	29	29	29.00	.	.
130	1	0	17	17	17.00	.	.
Total	90	26	7	33	25.08	5.929	35.151

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IRB2 #00003206

October 17, 2012

Fred Krieg, Ph.D.
Psychology Department

RE: IRBNet ID# 274494-2
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Krieg:

Protocol Title:	[274494-2] Targeted Based Cognitive TIER II Interventions to Increase Student Achievement
Expiration Date:	October 19, 2013
Site Location:	MU
Submission Type:	Continuing Review/Progress Report APPROVED
Review Type:	Exempt Review

The above study was approved for an additional 12 months by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee. The approval will expire October 19, 2013. Since this approval is within 30 days of the expiration date, the fixed anniversary date of 10/19 was maintained. Continuing review materials should be submitted no later than 30 days prior to the expiration date.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Michelle Woomer, B.A., M.S at (304) 696-4308 or woomer3@marshall.edu. Please include your study title and reference number in all correspondence with this office.